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09/740,664	12/19/2000	Takashi Niwa	S004-4168	3496

7590  
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09/16/2003

EXAMINER

LUU, THANH X

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 09/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/740,664

Applicant(s)

NIWA ET AL.

Examiner

Thanh X Luu

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,5-25 and 29-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17 and 29-32 is/are allowed.
- 6) ☒ Claim(s) 1,5-16,18,20-22,24,25,33-38,41,42 and 45-48 is/are rejected.
- 7) ☒ Claim(s) 19,23,39,40,43 and 44 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9. 6) ☐ Other:

### DETAILED ACTION

This Office Action is in response to amendments and remarks filed June 30, 2003. Claims 1, 5-25 and 29-48 are currently pending.

#### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the tip having a plurality of surfaces having different taper angles of claim 6; a convex portion disposed closer to the free end than the fixed end of claim 16; a convex portion disposed on the second main surface and closer to the fixed end than the tip of claim 17; and a method step of etching including the step of forming a convex portion in the transparent member spaced from the tip of claim 27 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: R1 mentioned on page 13 is not shown in Figure 2. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 9 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It appears that there is insufficient support for an embodiment that uses a "gradient-index lens." Examiner reminds Applicant that no new matter may be added.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 12-14 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Gemma et al. (U.S. Patent 5,675,532).

Regarding claims 12-14 and 37, Gemma et al. disclose (see Figures 7 and 8) a near-field optical probe, comprising: a cantilever having a first main surface (upper) and a second main surface (lower) opposite the first main surface, the cantilever being disposed at an inclination angle relative to a surface of a sample; a base (see Figure 8)

supporting the cantilever at the first main surface; a tip having a height and extending from the second main surface of the cantilever and having a microscopic aperture at an end; and a shade film (41) formed on the second main surface of the cantilever and on a surface of the tip except for the microscopic aperture; wherein when a radius of a light incident on the tip or detected by the microscopic aperture and being incident on a detector is  $R1$ , a distance  $L1$  from a center of the tip to a free end of the cantilever satisfies the claimed equation (see Figure 7 and 8). Gemma et al further disclose (see Figure 7) an end of the cantilever has a slant portion extending from the first main surface to the second main surface or vice versa and the tip is generally conical-shaped. That is, since  $R1$  can be the radius of light detected by the microscopic aperture,  $R1$  is the size of the microscopic aperture. From Figures 7 and 8,  $L1$  is obviously larger than the microscopic aperture (thus,  $R1 < L1$ ). Further,  $\theta 1$  is less than 45 degrees, the tangent of an angle less than 45 degrees is less than 1.  $H$ , the height of the tip is larger than  $L1$ . When  $H$  is divided by  $\tan \theta 1$ , the value is increased (thus,  $L1 < H/\tan \theta 1$ ). Thus, the relationship as claimed in the equations is satisfied.

7. Claims 1, 5-7, 10, 11, 20-22, 24, 25, 33-36, 41, 42 and 45-48 are rejected under 35 U.S.C. 102(b) as being anticipated by Sato et al. (EP 0964251).

Regarding claims 1, 5-7, 10, 11, 24, 25, 33-36, 41, 42 and 45-48, Sato et al. disclose (see Figure 2) a near-field optical probe, comprising: a cantilever formed of a transparent material (9) and having a first main surface and a second main surface; a base supporting the cantilever at the first main surface; a tip extending from the second main surface having a microscopic aperture, the tip being formed of a transparent

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material (8) having a higher refractive index than that of the cantilever to increase an amount of near-field light generated or detected by the microscopic aperture; and a shade film (6) formed on the second main surface of the cantilever and on a surface of the tip except for the microscopic aperture. Sato et al. also disclose (see Figure 2) the tip has a circular conical shape or generally conical-shaped or generally pyramidal-shaped, and the tip has a plurality of surfaces having different taper angles. Sato et al. further disclose (see Figure 9) the cantilever has a lens (29) for focusing incident light to the microscopic aperture. In addition, Sato et al. disclose (see Figure 10), an end of the tip is positioned nearly in the same plane as an end surface of the shade film and an end portion of the tip protrudes from an end face of the shade film as claimed. Sato et al. also disclose (see Figure 28) an introducing/detecting optical system; detecting means (56 or 58) for detecting a displacement of the cantilever, the detecting device having a light source (57) and an optical detector (59) disposed generally perpendicular to the cantilever; and a fine movement mechanism (61) as claimed.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. in view of Shimada et al. (U.S. Patent 6,335,522).

Regarding claim 8, Sato et al. disclose the claimed invention as set forth above. Sato et al. do not specifically disclose the lens comprises a fresnel lens. However, Shimada et al. do teach (see column 2, line 15-16) a probe having a fresnel lens as claimed. Shimada et al. further recognize (see column 2, line 38) that fresnel lens are advantageous in that the lenses can be easily manufactured by lithography. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a fresnel lens as claimed in the apparatus of Sato et al. in view of Shimada et al. to provide a probe that is easier to manufacture.

10. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gemma et al. in view of Shimada et al.

Regarding claim 38, Gemma et al. disclose the claimed invention as set forth above. Gemma et al. do not specifically disclose the tip being pyramidal in shape. Shimada et al. teach of a similar probe in which the tip is pyramidal in shape. Shimada et al. recognize that either a conical or pyramidal shaped tip functions equivalently. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a pyramidal shaped tip in the apparatus of Gemma et al. in view of Shimada et al. as desired.

11. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quate (U.S. Patent 5,354,985), hereinafter, Quate '985 in view of Gemma et al.

Regarding claims 12 and 15, Quate '985 discloses the claimed invention except for inclining the cantilever at an angle. Quate '985 further discloses a second portion (26) extending along a plane parallel to the first main portion (23) and a connecting

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portion (14, 15, 20) extending in a direction opposite the direction of the extension of the tip and connecting the first and second portion. Gemma et al. teach inclining a cantilever for near field probing. It would have been obvious to a person of ordinary skill in the art at the time the invention was made incline the cantilever in the apparatus of Quate '985 in view of Gemma et al. to obtain better positioning of the probe with respect to a sample.

12. Claims 12, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. in view of Gemma et al.

Regarding claims 12, 16 and 18, Shimada et al. disclose the claimed invention except for inclining the cantilever at an angle. Shimada et al. further disclose a convex portion (7) disposed closer to the free end than the fixed end and on the first main surface of the tip. Gemma et al. teach inclining a cantilever for near field probing. It would have been obvious to a person of ordinary skill in the art at the time the invention was made incline the cantilever in the apparatus of Shimada et al. in view of Gemma et al. to obtain better positioning of the probe with respect to a sample.

***Allowable Subject Matter***

13. Claims 17 and 29-32 are allowed over the prior art of record.

14. Claims 19, 23, 39, 40, 43 and 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.



***Response to Arguments***

15. Applicant's arguments with respect to claim 1 and its dependent claims have been considered but are moot in view of the new ground(s) of rejection.

16. Applicant's arguments with respect to claim 12 and its dependent claims have been fully considered but they are not persuasive.

Applicant asserts that Gemma et al. do not disclose the relationship of  $R1 < L1 < H/\tan\theta1$ . Examiner disagrees. As stated above, since R1 can be the radius of light detected by the microscopic aperture, R1 is the size of the microscopic aperture. From Figures 7 and 8, L1 is obviously larger than the microscopic aperture (thus,  $R1 < L1$ ). Further,  $\theta1$  is less than 45 degrees, the tangent of an angle less than 45 degrees is less than 1. Also, the height of the tip, H, is larger than L1. When H is divided by  $\tan\theta1$  (a value less than 1), the value is increased (thus,  $L1 < H/\tan\theta1$ ). Thus, the relationship as claimed in the equation is satisfied.

Thus, as set forth above, this rejection is proper.

***Conclusion***

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X. Luu whose telephone number is (703) 305-0539. The examiner can normally be reached on Monday-Friday from 6:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta, can be reached on (703) 308-4852. The fax phone number for the organization where the application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

txl  
September 12, 2003



Thanh X. Luu  
Patent Examiner